

REMARKS:

In the outstanding Office Action, the Examiner objected to 14, 15, 18, 19 and 28-31 and rejected claims 1-13, 16, 17, 20-27 and 32-40. Claims 1-3, 7-19, 30-35 and 38-40 are amended herein, and new claims 41-43 are added. No new matter is presented. Thus, claims 1-43 are pending and under consideration. The rejections are traversed below.

EXAMINER'S RESPONSE TO PREVIOUS AMENDMENT:

Applicants would like to thank the Examiner for taking the time to conduct the Interview on July 21, 2005. Starting on page 8 of the outstanding Office Action, the Examiner asserts that the calculation of the multilevel value reads on a conventional error diffusion process where error values based on a comparison between multilevel and determined binary values of previously processed pixels added to a multilevel of a current pixel.

Applicants respectfully submit that none of the cited references, as discussed in detail below, nor the Examiner's statement discussed in the previous paragraph teach or suggest that the multilevel value of a noteworthy pixel is calculated based on values of "other" pixels (i.e. without value of the noteworthy pixel).

Therefore, Applicants respectfully traverse the Examiner's statement and request that the Examiner produce authority for the statement.

ALLOWABLE SUBJECT MATTER:

On page 8 of the outstanding Office Action, the Examiner indicated that claims 14, 15, 18, 19 and 28-31 would be allowable if rewritten in independent form. Claims 14, 18 and 30 are amended to be in independent form, and the rejection of independent claim 1, upon which claims 15, 19, 28, 29 and 31 depend, is traversed below.

Therefore, claims 14, 15, 18, 19 and 28-31 are allowable.

REJECTION UNDER 35 U.S.C. § 102(b):

Claims 1, 2, 7-11, 16, 17 32-35 and 40 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,107,346 (Bowers).

Bowers detects gray-scale values of preselected arbitrary pixels and determines upper/lower limits of a range for each detected gray-scale value for selecting values between the upper/lower limits of the range to provide digital halftone images (see, col. 7, lines 67 through col. 8, lines 1-8). For example, as shown in FIG. 2 of Bowers, gray-scale value of a pixel located

at (x+1, y+1) becomes the detected gray-scale value for that pixel plus the propagated error. That is, Bowers is directed to an error diffusion process by detecting gray-scale values of pixels in accordance with the upper/lower limits of the range.

The present invention converts a multilevel input image into a binary image by assigning an estimated value to a given pixel based on multilevel values of other pixels regardless of the value of the given pixel.

Independent claims 1, 38 and 39 recite, "calculating the multilevel value of a given noteworthy pixel of the multilevel input image... based on the multilevel values of pixels other than the noteworthy pixel" and "converting the estimated multilevel value of the noteworthy pixel into a binary value in accordance with the multilevel values each time the multilevel input image is converted into a binary image."

Independent claim 40 also recites, "calculating an estimated value of a predetermined pixel "without using a multilevel value of the predetermined pixel" and converting the estimated multilevel value of the predetermined pixel into a binary value "each time the multilevel input image is converted into the binary image."

Bowers does not teach or suggest the above-discussed features of independent claims 1 and 38-40.

For at least the above-mentioned reasons, Applicants respectfully submit that claims depending from claim 1 are also patentably distinguishable over Bowers. The dependent claims are also independently patentable. For example, as recited in claims 10 and 11, "changing the technique of said error diffusing to another technique in accordance with a predetermined manner as the scanning of the pixels of the multilevel input image progresses." Bowers does not teach or suggest these features of claims 10 and 11.

Therefore, withdrawal of the rejection is respectfully requested.

REJECTION UNDER 35 U.S.C. § 103(a):

Claims 1-6, 8-13, 20-27 and 36-40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,757,517 (Couwenhoven).

Couwenhoven uses a filtered input value for a digitized continuous-tone input pixel for computing a filtered output value for each possible output level (see, col. 5, lines 46 through col. 6, line 17). However, Couwenhoven uses all the pixels within a particular vicinity to compute an activity signal as a difference between maximum/minimum input pixel values of pixels within the

particular vicinity (see, col. 5, lines 46-65).

Couwenhoven requires use of each value of the pixels, and thus, does not teach or suggest, "calculating the multilevel value... based on the multilevel values of pixels other than the noteworthy pixel" and converting the estimated multilevel value into a binary value in accordance with the multilevel values "each time the multilevel input image is converted into a binary image", as recited in independent claims 1, 38 and 39.

Similarly, Couwenhoven does not teach or suggest calculation of a value of a pixel "without using a multilevel value of the predetermined pixel", which is converted into a binary value "each time the multilevel input image is converted into the binary image", as recited in independent claim 40.

For at least the above-mentioned reasons, Applicants respectfully submit that claims depending from the independent claims are also patentably distinguishable over Couwenhoven. The dependent claims are also independently patentable. For example, as recited in claims 36 and 37, "if a plurality of multilevel input images to be halftoned have a substantially identical profile, said discriminating is carried out for only one of the plural multilevel input images, and the result of said discriminating is used in halftoning the remaining multilevel input images." Couwenhoven does not teach or suggest these features of claims 36 and 37.

Therefore, withdrawal of the rejection is respectfully requested.

NEW CLAIMS:

New claim 41 is added to emphasize that the present invention includes, "assigning an estimated value to a pixel of the multilevel input image based on multilevel values of neighboring pixels without using a multilevel value of the pixel regardless of value thereof."

New claim 42 is added to emphasize that the calculation of the multilevel value of a given noteworthy pixel in the present invention is based on "the multilevel values of non-binarized pixels other than the noteworthy pixel."

New claim 43 recites that calculation of the multilevel value of a given noteworthy pixel is based on "the multilevel values of non-binarized pixels, other than the noteworthy pixel, downstream of the noteworthy pixel in a primary scanning direction or in a secondary scanning direction".

The cited references, alone or in combination, do not teach or suggest, the above-

discussed features of new claims 41-43.

It is submitted that new claims 41-43 is patentably distinguishable over the cited references.

CONCLUSION:

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

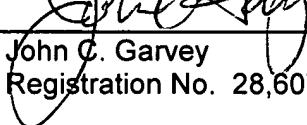
Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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